

## CLAIMS

What is claimed is:

*Subj A*

1. A method for modifying the characteristics of an acoustic wave, comprising the steps of:

- providing a medium for acoustic wave propagation;
- generating an acoustic wave;
- propagating the acoustic wave using the medium; and
- illuminating the medium during the propagation of the acoustic wave.

2. The method of Claim 1, wherein the medium is a piezoelectric substrate.

3. The method of Claim 2, wherein a transducer is formed on the piezoelectric substrate.

4. The method of Claim 3, wherein the acoustic wave is generated by the transducer.

5. The method of Claim 1, wherein the medium is illuminated using a laser diode.

6. The method of Claim 1, wherein the medium is illuminated using a light-emitting diode.

7. The method of Claim 6, further comprising the step of varying an intensity of a light generated by the light-emitting diode.

8. The method of Claim 7, wherein the intensity of the light is varied by a controller.

9. The method of Claim 7, wherein the intensity of the light is varied by a light modulator.

10. The method of Claim 1, further comprising the step of reading a selected frequency component of the acoustic wave.

11. A method for modifying the characteristics of an acoustic wave, comprising the steps of:

- generating an acoustic wave in a medium; and
- varying a velocity of the acoustic wave.

12. The method of Claim 11, wherein the medium is a piezoelectric substrate.

13. The method of Claim 11, wherein the velocity of the acoustic wave is varied by illuminating the medium.

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14. The method of Claim 12, wherein a transducer is formed on the piezoelectric substrate.
15. The method of Claim 14, wherein the acoustic wave is generated by the transducer.
16. The method of Claim 11, further comprising the step of reading a selected frequency component of the acoustic wave.

(17.) An apparatus for varying the characteristics of an acoustic wave, comprising:

- a medium for acoustic wave propagation;
- a transducer formed on the medium; and
- a light source illuminating the medium.

18. The apparatus of Claim 17, wherein the medium is a piezoelectric substrate.
19. The apparatus of Claim 17, wherein the transducer generates an acoustic wave.
20. The apparatus of Claim 17, wherein the light source is a laser diode.
21. The apparatus of Claim 17 wherein the light source is a light-emitting diode.
22. The apparatus of Claim 21, wherein an intensity of a light generated by the light-emitting diode is varied.
23. The apparatus of Claim 22, wherein the intensity of the light is varied by a controller.
24. The apparatus of Claim 17, wherein a selected frequency component of the acoustic wave is read from the transducer.
25. The apparatus of Claim 22, wherein the intensity of the light is varied by a light modulator.
26. A method for making an acoustic wave device, comprising the steps of:
  - providing a medium for acoustic wave propagation;
  - forming a transducer on the medium; and
  - providing a light source for illuminating the medium.
27. The method of Claim 26, wherein the medium is a piezoelectric substrate.
28. The method of Claim 26, wherein the light source is a laser diode.
29. The method of Claim 26, wherein the light source is a light-emitting diode.
30. The method of Claim 26, further comprising the step of providing means for varying an intensity of a light generated by the light-emitting diode.
31. The method of Claim 30, wherein the means for varying the intensity of the light comprises a controller.

32. The method of Claim 30, wherein the means for varying the intensity of the light comprises a light modulator.

33. An apparatus for varying the characteristics of an acoustic wave, comprising:

a medium for acoustic wave propagation; and

a transducer formed on the medium,

wherein a light source is used to illuminate the medium.

34. The apparatus of Claim 33, wherein the medium is a piezoelectric substrate.

35. The apparatus of Claim 33, wherein the transducer generates an acoustic wave.

36. The apparatus of Claim 33, wherein the light source is a laser diode.

37. The apparatus of Claim 33 wherein the light source is a light-emitting diode.

38. The apparatus of Claim 37, wherein an intensity of a light generated by the light-emitting diode is varied.

39. The apparatus of Claim 38, wherein the intensity of the light is varied by a controller.

40. The apparatus of Claim 33, wherein a selected frequency component of the acoustic wave is read from the transducer.

41. The apparatus of Claim 38, wherein the intensity of the light is varied by a light modulator.

42. A method for modifying the characteristics of an acoustic wave, comprising the steps

of:

providing a medium for acoustic wave propagation;

generating an acoustic wave;

propagating the acoustic wave using the medium; and

inducing a charge grating in the medium during the propagation of the acoustic

wave.

43. The method of Claim 42, wherein the medium is a piezoelectric substrate.

44. The method of Claim 43, wherein a transducer is formed on the piezoelectric substrate.

45. A method for making an acoustic wave device, comprising the steps of:

providing a medium for acoustic wave propagation;

forming a transducer on the medium; and

providing a light source for inducing a charge grating in the medium.

46. The method of Claim 45, wherein the medium is a piezoelectric substrate.
47. The method of Claim 45, wherein the light source is a laser diode.
48. The method of Claim 45, wherein the light source is a light-emitting diode.
49. The method of Claim 45, further comprising the step of providing means for varying an intensity of a light generated by the light-emitting diode.
50. The method of Claim 49, wherein the means for varying the intensity of the light comprises a controller.
51. The method of Claim 49, wherein the means for varying the intensity of the light comprises a light modulator.

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